

CLAIMS

I claim:

1 1. A method of evaporating cooling fluids in a turbine engine, comprising:
2 spraying a cooling fluid from at least one fluid emitting device into a duct,
3 whereby a plurality of droplets is formed;
4 applying an electrical charge to the plurality of droplets forming charged
5 droplets; and
6 directing the plurality of charged droplets through the duct upstream of a
7 compressor of a turbine engine whereby substantially all of the plurality of charged
8 droplets are evaporated before reaching the compressor.

1 2. The method of claim 1, further comprising applying an electrical charge
2 to the duct, whereby the electrical charge applied to the duct has a polarity that is
3 opposite to a polarity of the charge applied to the plurality of droplets.

1 3. The method of claim 1, further comprising applying an electrical charge
2 to the duct, whereby the electrical charge applied to the duct has a polarity that is
3 equal to a polarity of the charge applied to the plurality of droplets.

1 4. The method of claim 1, further comprising applying an electrical charge
2 to at least one baffle positioned downstream from the at least one fluid emitting
3 device.

1 5. The method of claim 4, wherein applying an electrical charge to at least
2 one baffle comprises applying an electrical charge having a polarity that is opposite
3 to a polarity of the electrical charge applied to the plurality of droplets if a residence
4 time of the cooling fluids in the duct is not sufficient for a substantial portion of the
5 plurality of droplets emitted into the duct to be evaporated before reaching the
6 compressor of the turbine engine.

1 6. The method of claim 4, wherein applying an electrical charge to at least
2 one baffle comprises applying an electrical charge having a polarity that is equal to a
3 polarity the electrical charge applied to the plurality of droplets if a residence time of
4 the cooling fluids in the duct is sufficient for a substantial portion of the plurality of
5 droplets emitted into the duct to be evaporated before reaching the compressor of
6 the turbine engine.

1 7. A turbine engine, comprising:
2 a compressor having a plurality of turbine blades coupled to a rotatable disc;
3 at least one duct coupled to the compressor for directing air into the
4 compressor;
5 at least one fluid emitting device for spraying a cooling fluid into the at least
6 one duct, whereby a plurality of droplets are formed; and
7 at least one electrode positioned in the duct for applying an electrical charge
8 to at least a portion of the plurality of droplets.

1 8. The turbine engine of claim 7, further comprising at least one baffle
2 positioned in the at least one duct downstream of the at least one fluid emitting
3 device and upstream of the compressor.

1 9. The turbine engine of claim 8, further comprising at least one electrode
2 coupled to the at least one baffle for applying an electrical charge to the at least one
3 baffle.

1 10. The turbine engine of claim 7, further comprising at least one electrode
2 coupled to the duct for applying an electrical charge to the duct.

1 11. The turbine engine of claim 7, wherein the at least one device for
2 spraying a cooling fluid into the at least one duct comprises at least one nozzle
3 adapted to emit droplets having a Dv90 measurement less than about 50 microns.

1 12. The turbine engine of claim 11, wherein the at least one device for
2 spraying a cooling fluid into the at least one duct comprises at least one nozzle
3 adapted to emit droplets having a Dv90 measurement less than about 20 microns.

1 13. The turbine engine of claim 7, wherein the duct is grounded.

1 14. An evaporative cooling system for a turbine engine, comprising:
2 at least one duct for directing air into a compressor of a turbine engine;

3 at least one fluid emitting device for spraying a cooling fluid into the at least
4 one duct, whereby a plurality of droplets are formed;
5 at least one electrode positioned in the duct for applying an electrical charge
6 to at least a portion of the plurality of droplets.

1 15. The evaporative cooling system of claim 14, further comprising at least
2 one electrode coupled to the duct for applying an electrical charge to the duct.

1 16. The evaporative cooling system of claim 14, wherein the at least one
2 fluid emitting device for spraying a cooling fluid into the at least one duct comprises
3 at least one nozzle adapted to emit droplets having a Dv90 measurement less than
4 about 50 microns.

1 17. The evaporative cooling system of claim 14, further comprising at least
2 one baffle positioned in the at least one duct downstream of the at least one fluid
3 emitting device and upstream of the compressor.

1 18. The evaporative cooling system of claim 17, further comprising at least
2 one electrode coupled to the at least one baffle for applying an electrical charge to
3 the at least one baffle.

1 19. The evaporative cooling system of claim 14, wherein the duct is
2 grounded.